# Installing a Microcell Electron Capture Detector

**Agilent 6850 Series II Network GC System**

**Accessory G3347B**

These instructions are divided into three parts:

- **Part 1** to prepare the Electronic Pressure Control ("EPC") module for later installation into the Agilent 6850 Gas Chromatograph ("GC")
- **Part 2** to prepare the µECD Signal board for later installation
- **Part 3** to perform the actual Accessory installation into the GC

## Part 1: Preparation of the µECD EPC module

Locate the following item found in your Accessory kit:

| Covers Kit G2630-60080 consisting of: | Qty. |
|---|---|
| Front EPC cover | 1 |
| Back EPC cover | 1 |
| Hex nuts, 7/16-inch | 3 |
| Grommet, 7/16-inch | 1 |
| Screw, M4 x12 mm, pan head | 3 |

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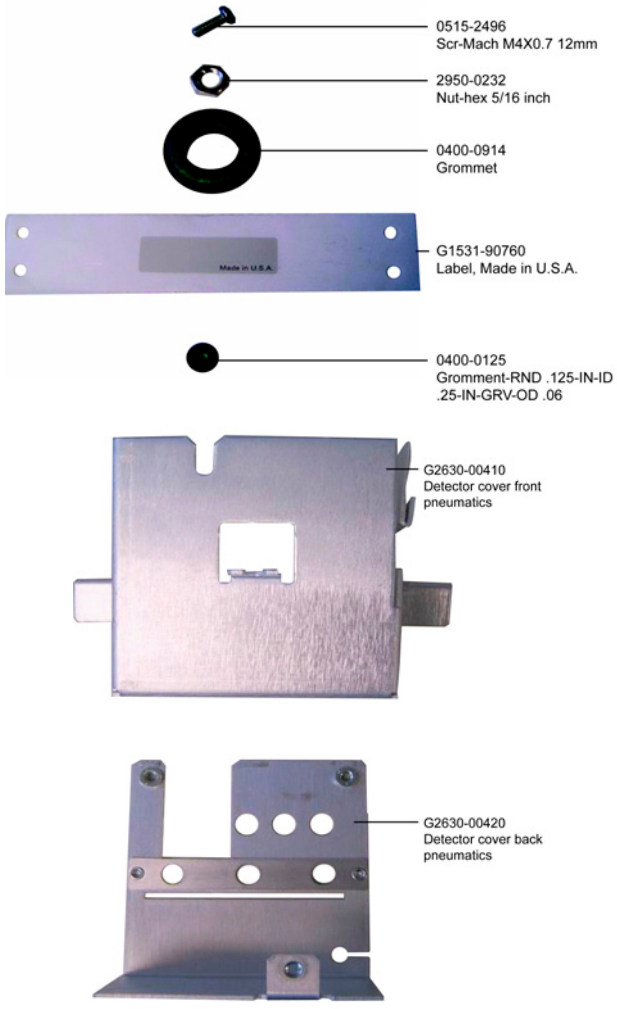



**Caution** Some of these assemblies contain printed circuit boards so standard ESD precautions must be followed: use a static control wrist strap (supplied) connected to a suitable ground in handling the assemblies.

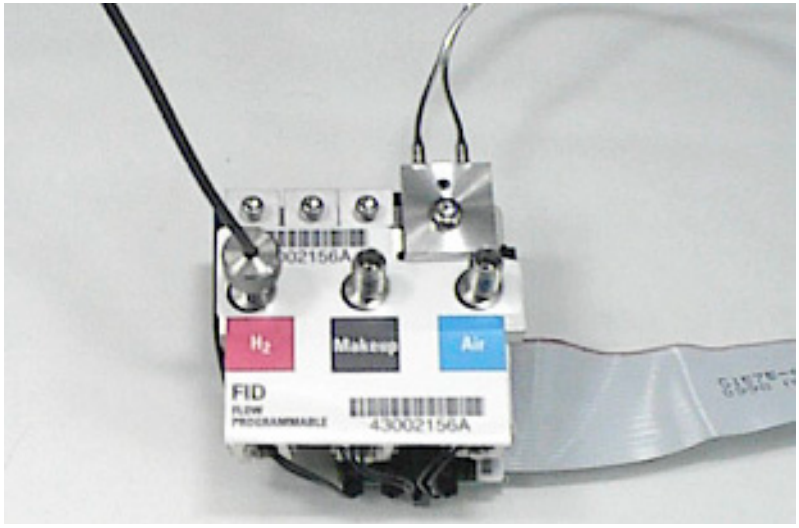
## Tools Required

Torx™ T-20 driver

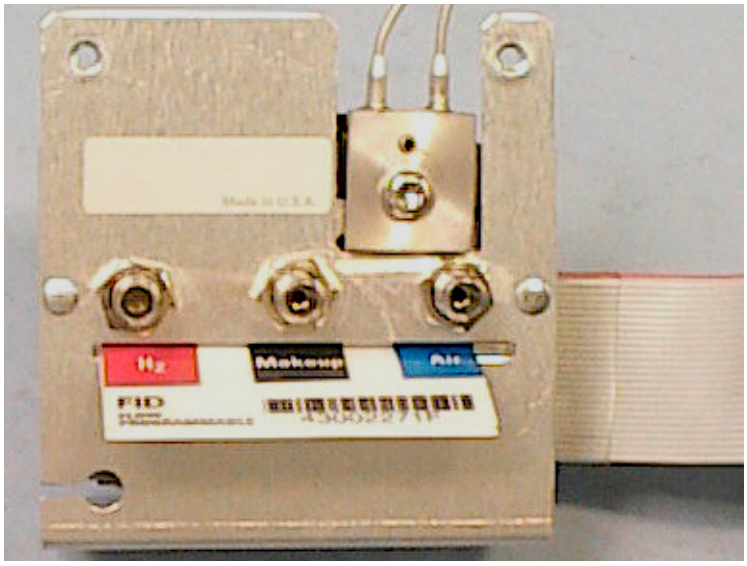
7/16-inch open end wrench or nut driver

## Procedure

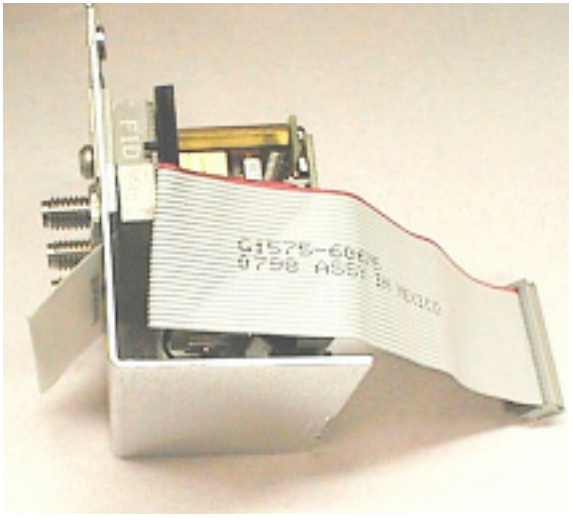
1. Prepare a suitable clean, dry, static-free work area.
2. Place the detector system assembly such that its EPC module is centered in your work area with its tubes oriented away from you and its ribbon cable extending to the right.




3. Remove dust caps from the gas connection fittings.
4. Install the back cover onto the three gas fittings making sure the label passes through slot provided. Loosely secure the cover using 7/16-inch hex nuts, one onto each fitting.



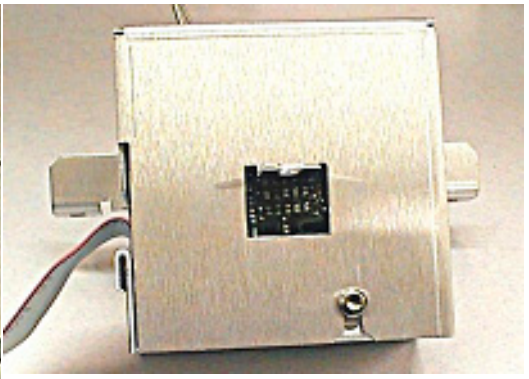

5. Reorient the module such that the ribbon cable is upwards and gas fittings are to the left.
6. Fold the cable first to the left and gently crease it at the PC board to maintain the direction. Then fold the cable back on itself to the right and make a gentle crease such that the second fold is just inside the just-installed back cover.

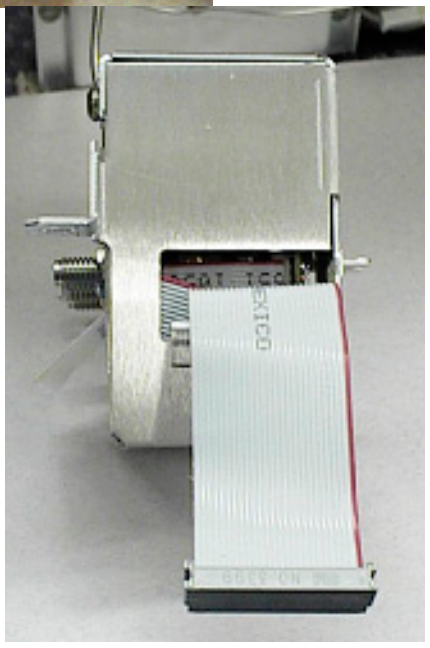


7. Next, fold and gently crease the cable back on itself again, but at an angle such that it now extends at 90-degrees away from you (in the direction of tubing from the module).

If correctly done, the cable and its folds will be entirely within the body of the module, and the free end of the cable and its connector will extend from the module in the direction of the tubing.

8. Fit the front cover onto the previously-installed back cover, securing it loosely using three screws provided, two in the gas fittings side and one in the PC board side. Make sure the ribbon cable and its connector exit through the slot provided.





9. Finally, firmly secure all cover screws and hex nuts on the gas connection fittings. Then replace protective dust caps onto the gas connection fittings to maintain cleanliness.

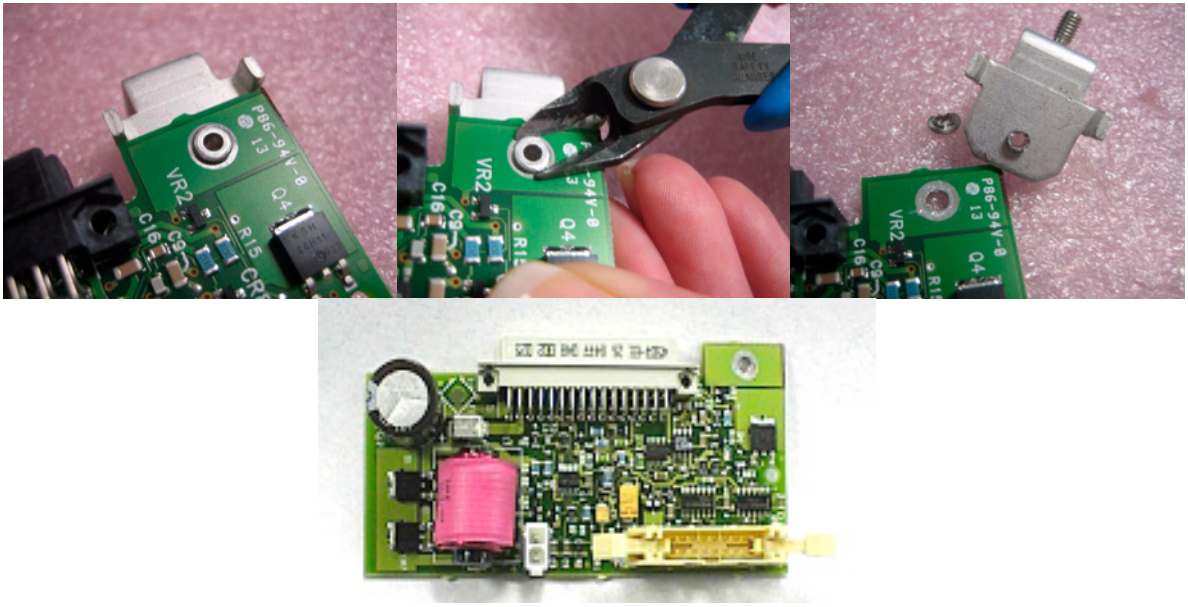
This completes EPC module preparation for this Accessory.

# Part 2: Preparation of the µECD Signal Board

Locate the µECD Signal board:

## Procedure

Using a small, sharp pair of diagonal wire cutters, remove and discard the small bracket from the location shown:



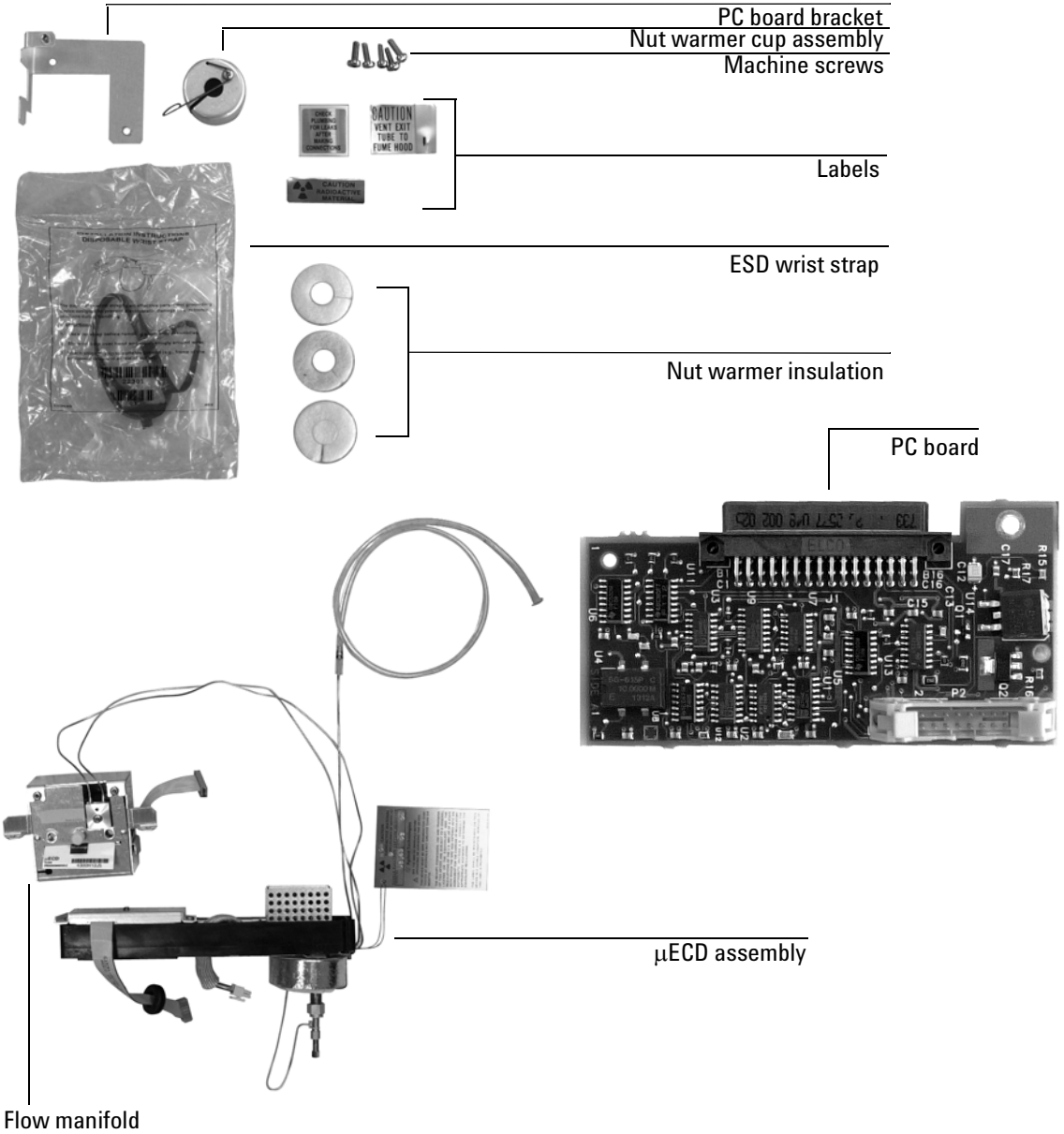

This completes preparation of the µECD Signal board.

# Part 3: Installation of the µECD Accessory

This kit contains:

| Description | Quantity |
|---|---|
| µECD detector, including PC (Signal) board | 1 |
| Test sample | 1 |
| Warning card | 1 |
| Wipe test kit | 1 |
| ECD caution label | 1 |
| Nut warmer cup assembly | 1 |
| Nut warmer insulation | 3 |
| Nameplate | 1 |
| ESD wrist strap (disposable) | 1 |
| Machine screws M4 x .7mm 12mm | 5 |
| Minifold label | 1 |
| Ship kit | 1 |
| PC board bracket | 1 |
| Bracket screw M3 x 0.5mm 12mm - large | 1 |
| Installation sheet (this document) | 1 |

This detector is factory-assembled. Do not disassemble it during installation.


PC board bracket
Nut warmer cup assembly
Machine screws
CAUTION
VENT EXIT
TUBE TO
FUME HOOD
Labels
ESD wrist strap
Nut warmer insulation
PC board
μECD assembly
Flow manifold

## Required Tools

- Electrostatic protection such as grounded wrist strap (part no. 9300-0969, large or part no. 9300-0970, small)
- T-20 Torx screwdriver
- Diagonal cutters
- 7/16-inch wrench (non-EPC detectors only)

## Overview

**NOTE:** This document assumes a detector is already installed in the GC.

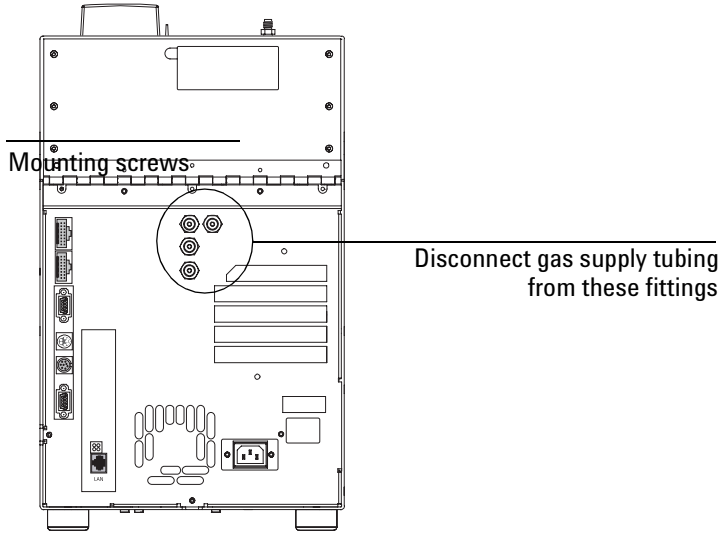
**Caution** Before starting, review safety information at the end of this document.

1. Disconnect the GC.
2. Remove the lid top cover.
3. Disconnect the heater/sensor cable.
4. Raise the lid to the service position.
5. Remove the PC board.
6. Remove the existing detector and flow manifold.
7. Install the new detector and flow manifold.
8. Route the tubing.
9. Install the nut warmer cup.
10. Connect the heater/sensor cable.
11. Connect the ribbon cable to the PC board.
12. Apply the labels.
13. Restore the GC to operating condition.

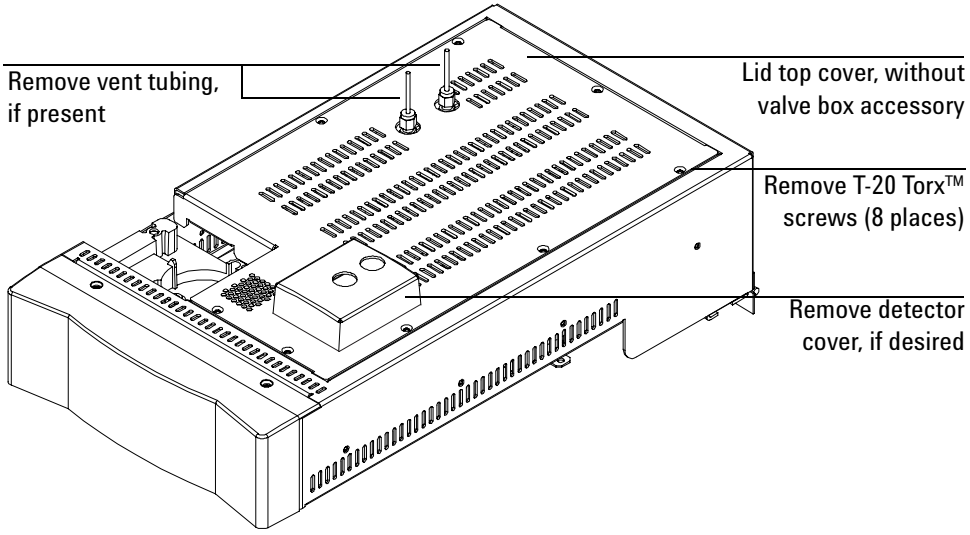
## Disconnect the GC

**WARNING** Hydrogen gas is flammable and potentially explosive. Before replacing the manifold, turn off the hydrogen gas at the source.

1. Turn off the GC and unplug the power cord. Allow time for all heated zones to cool.
2. Open the lid. If a column is installed, disconnect it at the detector end. Remove the nut warmer, insulation, and capillary adapter, if present. Close the lid.
3. Turn all gases off at their sources. Disconnect the carrier and detector gas tubing from the back panel of the instrument.



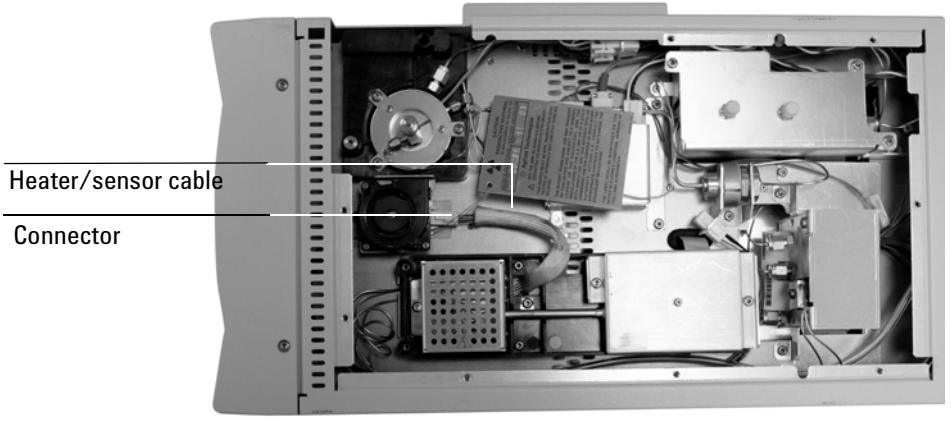
## Remove the lid top cover


Remove vent tubing, if present
Lid top cover, without valve box accessory
Remove T-20 Torx™ screws (8 places)
Remove detector cover, if desired

Remove the lid top cover. If you are replacing an FPD, remove all sections.

## Disconnect the heater/sensor cable

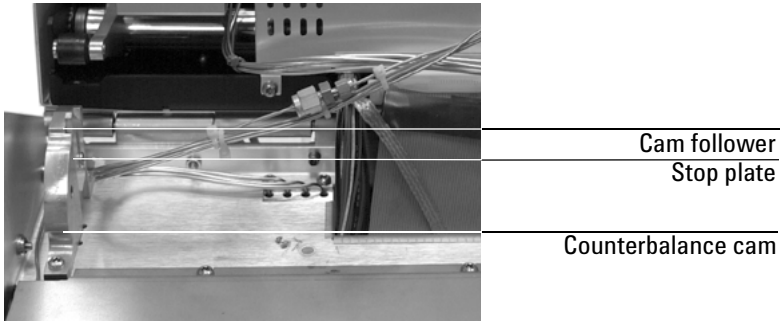
1. Trace the detector heater/sensor cable to the wiring harness near the injection port cooling fan.




2. Disconnect the cable at the connector.

## Raise the lid to the service position

1. Open the lid. Locate the counterbalance cam in the left rear corner under the lid. Loosen the screw on the right side of the cam. This allows the stop plate to drop down.

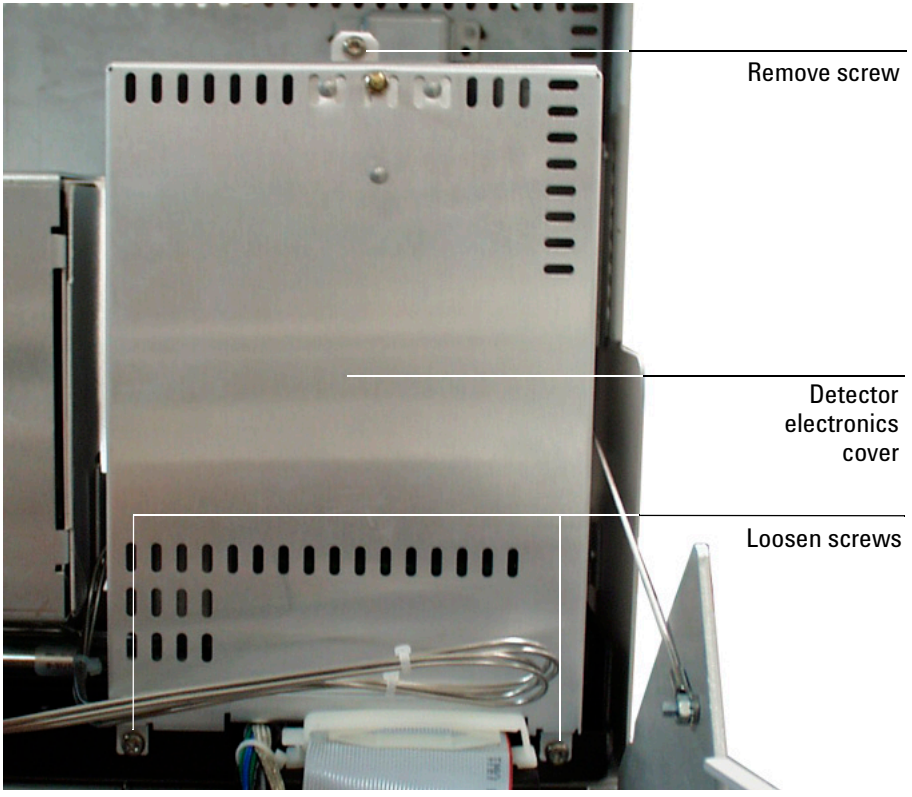



2. Raise the lid until it is stopped by the safety cable.
3. Raise the stop plate and tighten the screw to lock the lid in the upright service position.

**WARNING** The lid is heavy. Always lock the lid when it is in the service position.

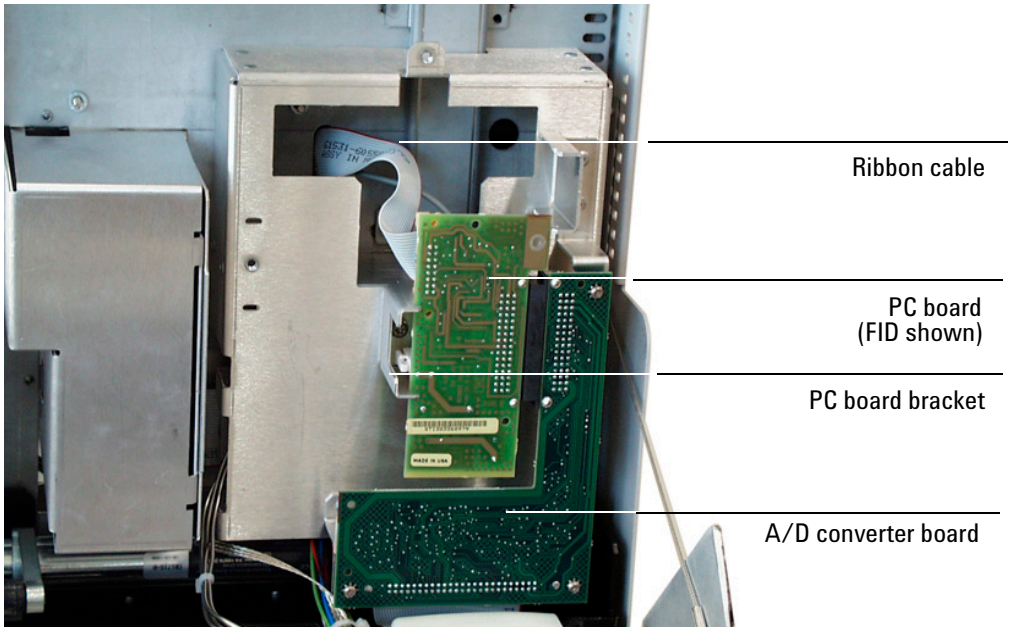
## Remove the PC board

1. Loosen the two bottom screws on the detector electronics cover.




2. Remove the top screw on the cover.
3. Lift and remove the detector electronics cover.

4. Loosen the PC board bracket.

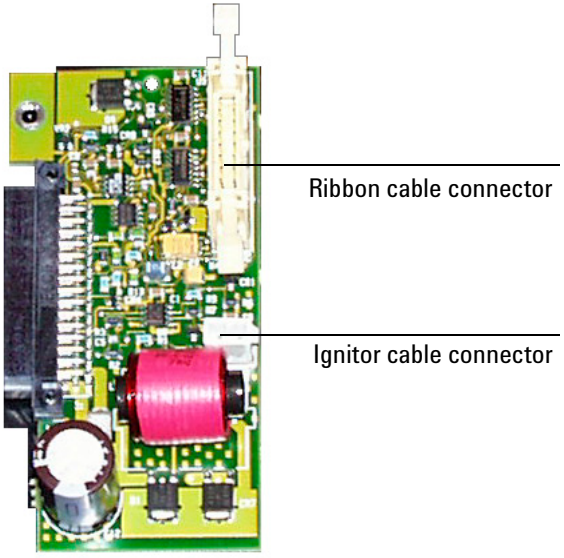



5. Unplug the PC board from the A/D converter board.

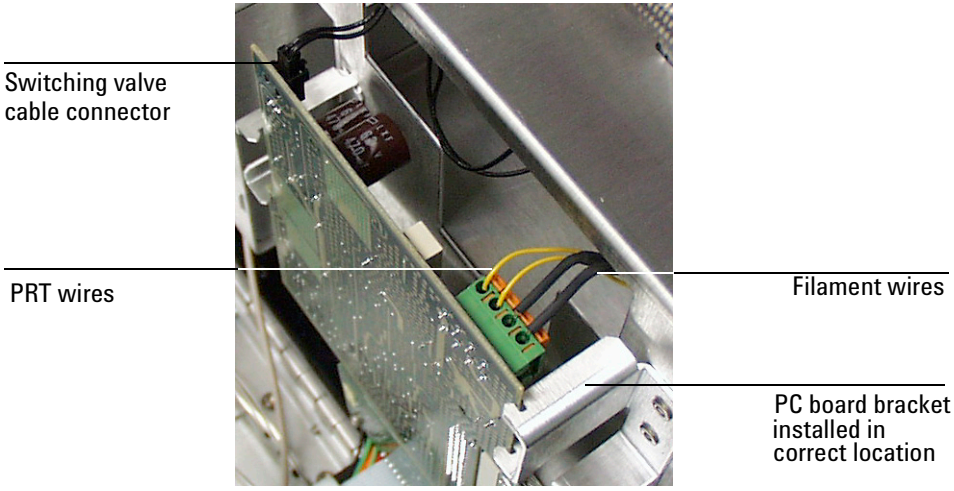
6. Disconnect the wiring from the PC board.

   **All detectors** – Disconnect the ribbon cable. The ribbon cable connector will not pass through the rubber grommet in the hole. Use a small screwdriver to push the grommet to the top of the lid; the cables will now fit through the hole. Save the grommet for when you put the GC back together.

   **FPD, FID** – Unplug the ignitor cable. Pass all cables through the hole to the top side of the lid. The FID PC board is shown below.



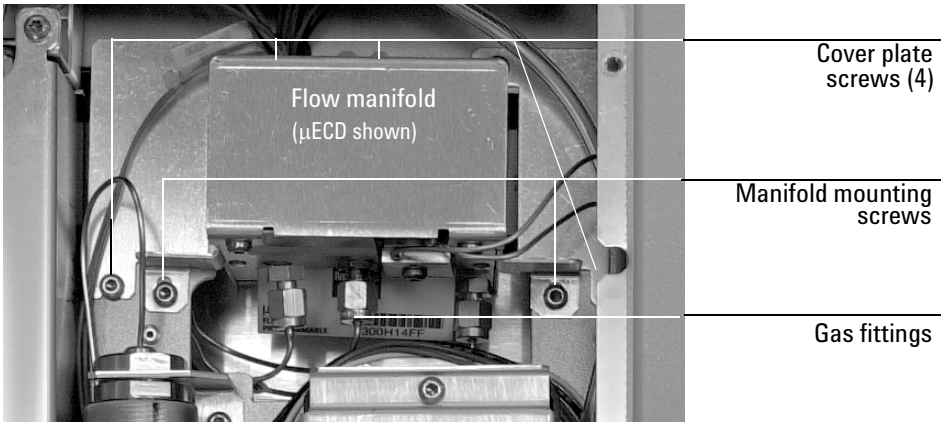
**TCD** – Unplug the two-wire switching valve cable at the connector. To release the PRT and filament wires, press down on the orange tabs. Pass the disconnected wires through the hole to the top side of the lid.




7. Lower the stop plate on the lid cam. Pull the lid forward until the cam follower rests on the curved surface of the cam. Leave the stop plate in the "down" position.
8. Close the lid.

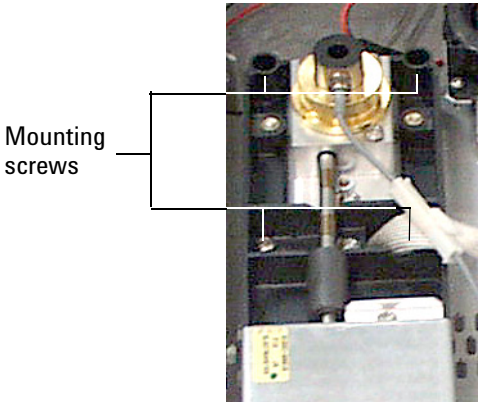
## Remove the existing detector and flow manifold

1. On the top of the lid, loosen the connector cover plate screws and remove the plate.

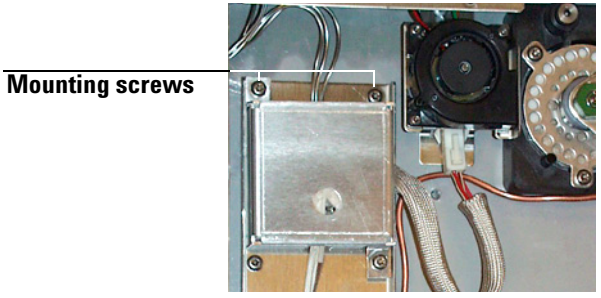



2. Disconnect the gas fittings. The figure shows the μECD manifold; the other manifolds are similar but vary in the number of gas connections.
3. Trace the ribbon cable from the flow manifold and disconnect it from the harness.
4. Remove the three manifold mounting screws.
5. Remove the screws holding the detector assembly in place. You will need a new top cover.

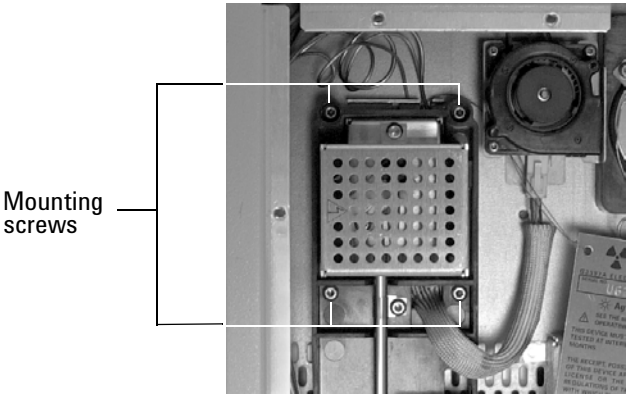
**FID** – Remove four mounting screws.



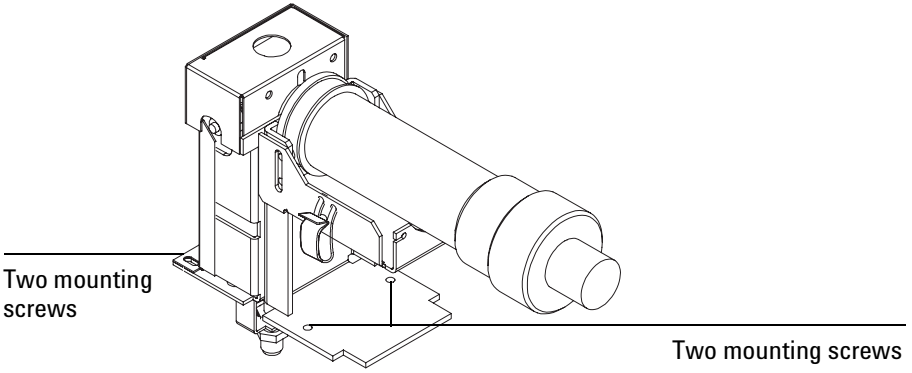

**TCD** – Remove two mounting screws.




μ**ECD** - Remove four mounting screws.




**FPD** - Remove four mounting screws. You will need a new top cover.




6. Lift the detector and flow manifold out of the lid as a unit.

**WARNING** The fibrous insulation material can cause irritation to the skin, eyes, and mucous membranes. Always wear gloves when working with the insulation. If the insulation is flaky/crumbly, wear protective eye wear and respirator.

7. Remove any insulation that may be in the hole under the detector.

## Install the new detector and flow manifold

**Caution** Board components can be damaged by static electricity; use a properly grounded static control wrist strap when handling the board.

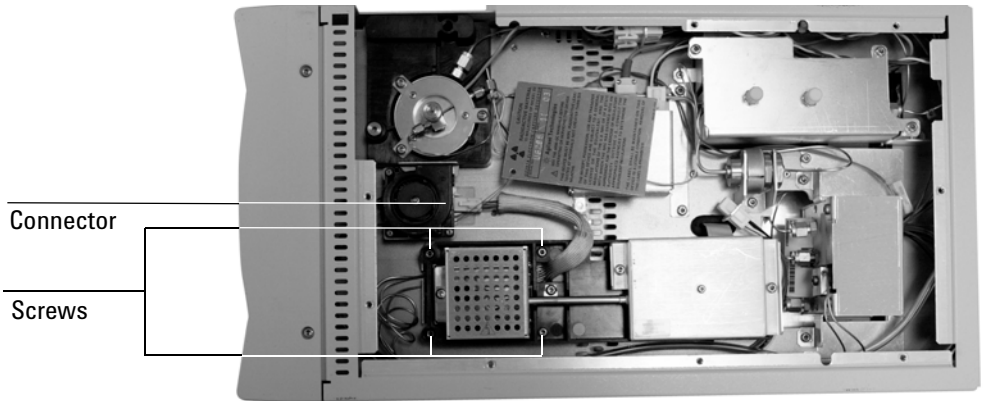
**WARNING** The effluent gas stream from the detector must be vented to a fume hood to prevent possible contamination of the laboratory with radioactive material.

**USA Owners:** Detector venting must be in conformance with the latest revision of Title 10, Code of Federal Regulations, Part 20 (including Appendix B).

1. If this is a new installation of a μECD, cut an insulation slot in the lid so the makeup gas adapter tubing fits the lid. The makeup gas adapter tubing should fit through the slot.

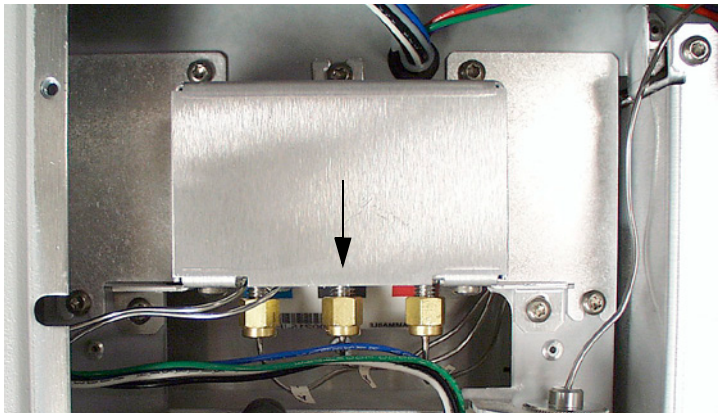
**WARNING** Do not take apart μECD assemblies. They are meant to be kept as a single unit.

2. Place the new detector and flow manifold in position in the lid. Check that no wiring or tubing is trapped under either assembly.




3. Secure the detector assembly to the lid with four screws.
4. Secure the manifold to the lid with three screws.

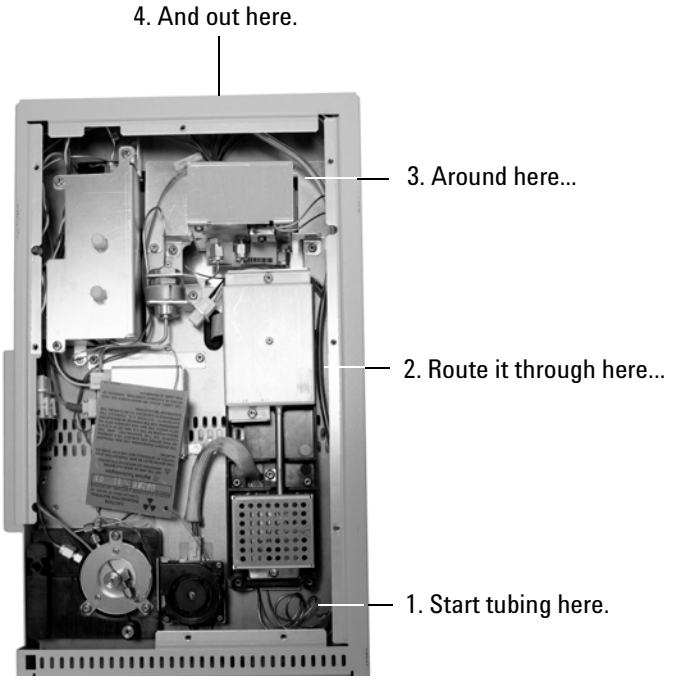
5. Plug the manifold ribbon cable into its connector.
6. Install the two connector cover plates.
7. Connect gas supply line M as shown below.

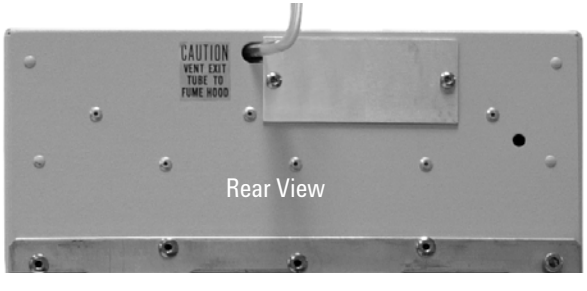


If the previous detector was an FID or FPD, lines marked A and H will be in the manifold area. They will not be used.

## Route the tubing

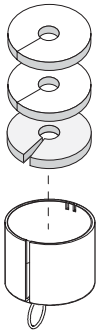
Route the vent tube from the detector (1), along the right side of the lid (2), behind the flow manifold (3) and out the vent tube hole (4).



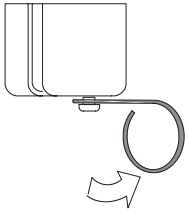



## Install the nut warmer cup

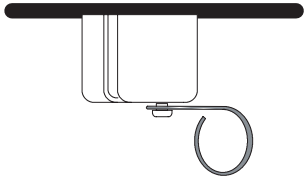
1. Install the insulation in the cup.



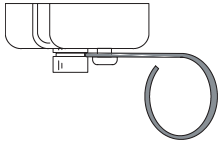
2. Push the wire spring lever at the bottom of the cup to the right to uncover the hole.



3. From inside the oven, place the cup over the detector fitting so that the top of the cup touches the top of the oven.



4. Release the spring. Make certain the spring fits in the groove of the detector fitting.



## Connect the heater/sensor cable

Connect the detector heater/sensor cable to the wiring harness near the injection port cooling fan.

## Connect the ribbon cable to the PC board

1. Raise the lid to the service position and lock it in place by raising the stop plate.
2. There is an oblong hole through the lid near the left rear corner of the detector assembly. If there is a grommet in the hole, remove it.
3. Pass the ribbon cable through the hole into the PC board space. Install the saved grommet over the ribbon cable.
4. Use a small screwdriver to install the grommet around the edges of the oblong hole.
5. If needed. install the new PC board bracket using two of the machine screws. See Figure 1.
6. Connect the ribbon cable to the PC board.

7. Turn the PC board over, plug it into the A/D converter board. Secure it with the PC board bracket using the bracket screw.

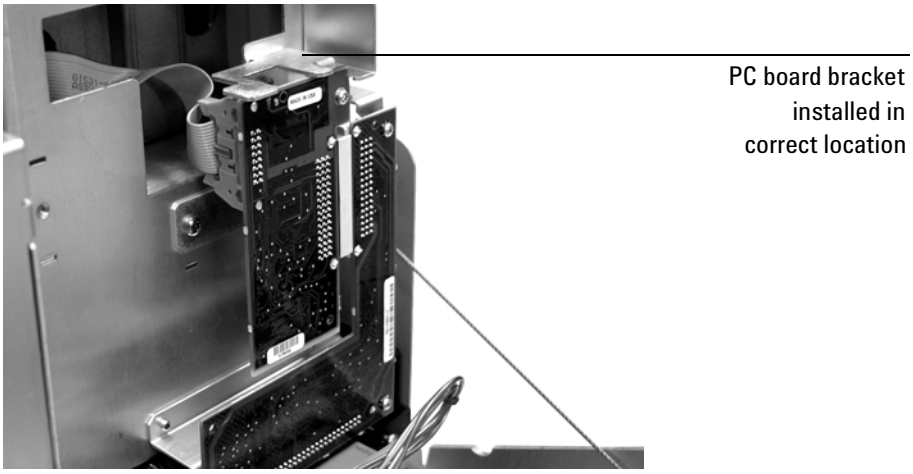
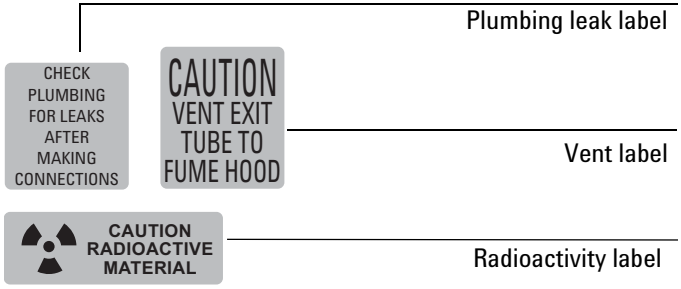



**Figure 1. PC board and bracket installed**

8. Install the detector electronics cover and tighten all three screws.
9. Lower the stop plate on the lid cam. Pull the lid forward until the cam follower rests on the curved surface of the cam. Raise the stop plate behind the cam follower and tighten the screw.
10. Close the lid. Be sure that the folded gas lines do not interfere with it.
11. Install the lid top cover.

## Apply the labels

There are three labels you must apply on the machine.


Plumbing leak label
CHECK PLUMBING FOR LEAKS AFTER MAKING CONNECTIONS
CAUTION VENT EXIT TUBE TO FUME HOOD
Vent label
CAUTION RADIOACTIVE MATERIAL
Radioactivity label

Place the:

- Plumbing leak label next to the fittings for the gas supply tubing (on the back panel).
- Vent label to the left of the vent tube hole on the back of the GC.
- Radioactivity label on top of the lid cover between the detector cover and the inlet.

## Restore the GC to operating condition

1. Install the capillary adapter, if used.
2. Restore the column connection.
3. Restore carrier and other gases to the instrument.
4. Restore power.
5. Apply your normal operating pressures. Leak-check the manifold, back panel, and column fittings.

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Part number G2630-90001
Replaces G2630-90000
First Edition, April 2004
Second Edition, February 2007
Printed in USA

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Wilmington, DE 19808-1610

**Safety Symbols**

Warnings in the manual or on the instrument must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions violates safety standards of design and the intended use of the instrument. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

**In the manual**

A warning calls attention to a condition or possible situation that could cause injury to the user.

A caution calls attention to a condition or possible situation that could damage or destroy the product or the user's work.

**On the instrument**

See accompanying instructions for more information.

Indicates a hot surface.

Indicates hazardous voltages.

Indicates earth (ground) terminal.

Indicates explosion hazard.

Indicates radioactivity hazard.

Indicates electrostatic discharge hazard.

Pinch hazard.

Agilent Technologies, Inc.
Printed in USA April 2007

G2630-90001